

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 6,723,656 B2  
APPLICATION NO. : 09/902931  
DATED : April 20, 2004  
INVENTOR(S) : Kirk Martin

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It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

The title page should be deleted to appear as per attached title page.  
The sheets of drawings consisting of figures 1-7 should be deleted to appear as per attached figures 1-7.

Signed and Sealed this  
Eighteenth Day of September, 2007



JON W. DUDAS  
*Director of the United States Patent and Trademark Office*

(12) United States Patent  
Martin(10) Patent No.: US 6,723,656 B2  
(45) Date of Patent: Apr. 20, 2004(54) METHOD AND APPARATUS FOR ETCHING  
A SEMICONDUCTOR DIE

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(73) Assignee: Nisene Technology Group,  
Watsonville, CA (US)(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 27 days.

(21) Appl. No.: 09/902,931

(22) Filed: Jul. 10, 2001

## (65) Prior Publication Data

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(52) U.S. Cl ..... 438/745; 438/106; 438/112;  
438/124; 438/748; 438/750(58) Field of Search ..... 438/106, 112,  
438/124, 128, 459, 745, 748, 750, 756

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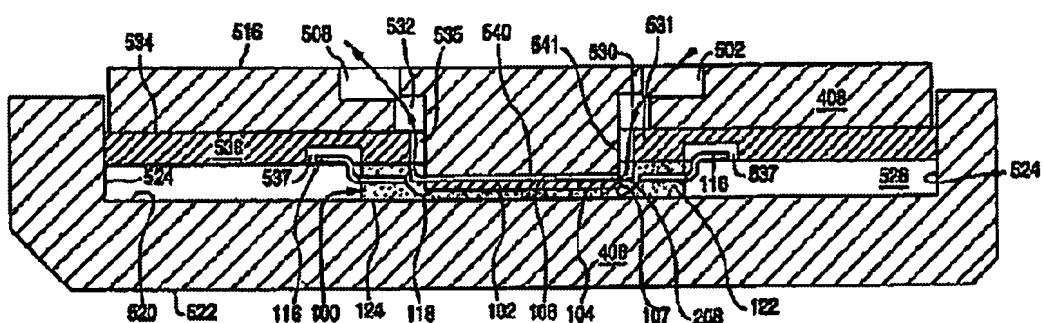
Primary Examiner—Lan Vinh

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Carmen C. Cook

## (57) ABSTRACT

A method and apparatus for etching a semiconductor die are disclosed whereby flowing an etchant material across an inactive thereof thins the semiconductor die. In one embodiment, the etchant includes a mixture of nitric acid, hydrofluoric acid, and acetic acid and turbulent flows from one edge of the semiconductor die, across the inactive surface of the semiconductor die, to an opposing edge of the semiconductor die.

26 Claims, 7 Drawing Sheets

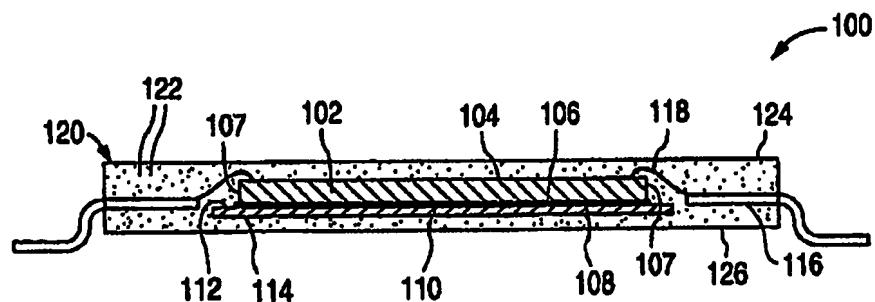


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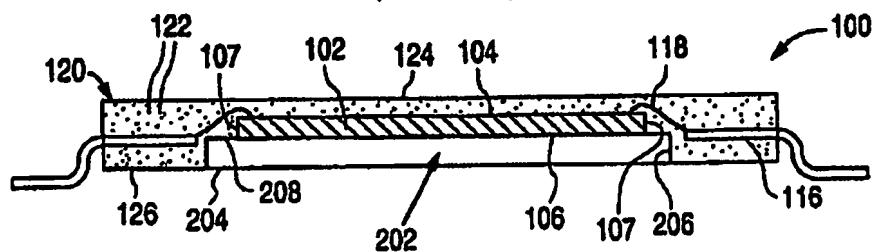
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**FIG. 1**  
(Prior Art)



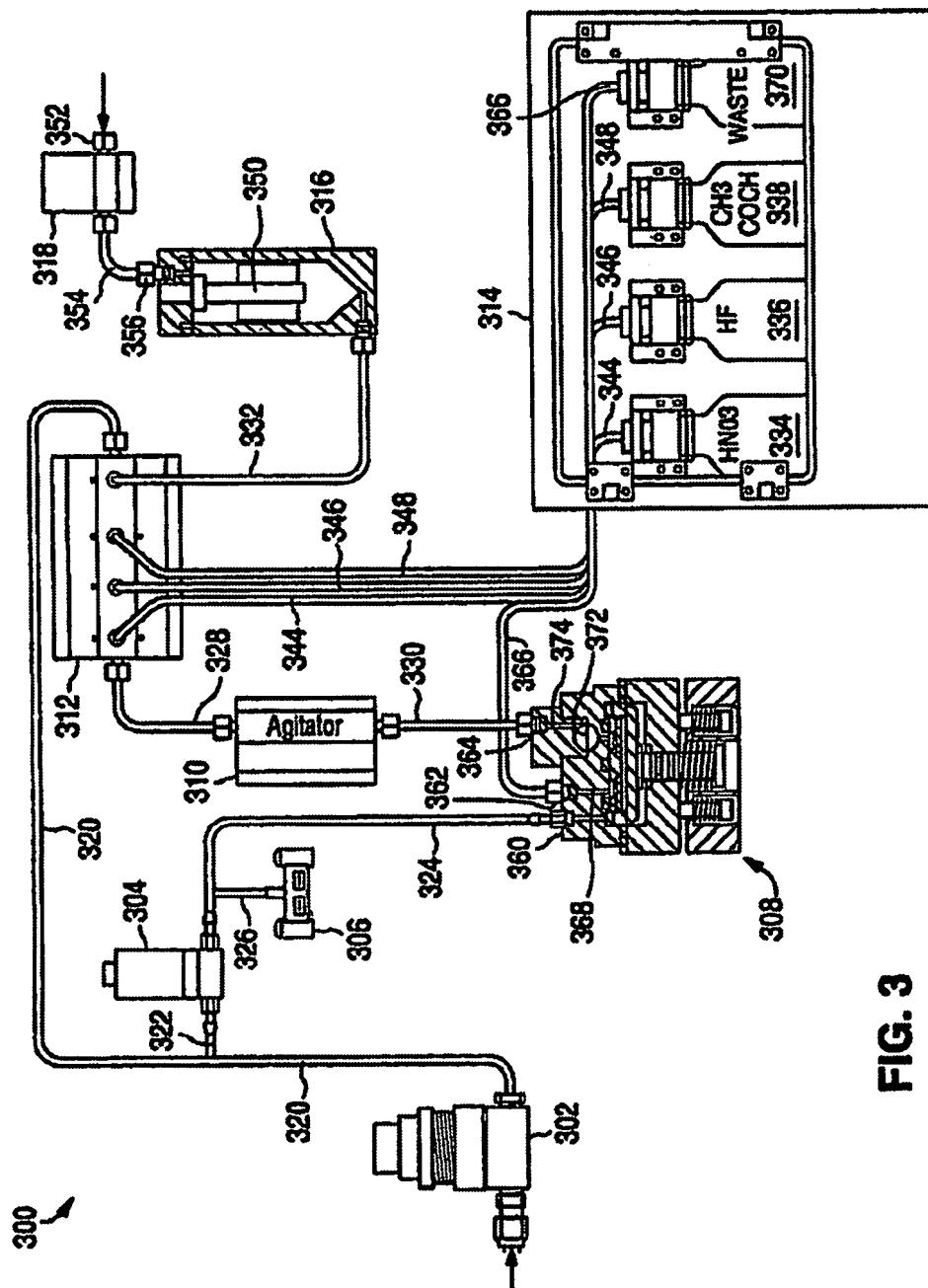
**FIG. 2**

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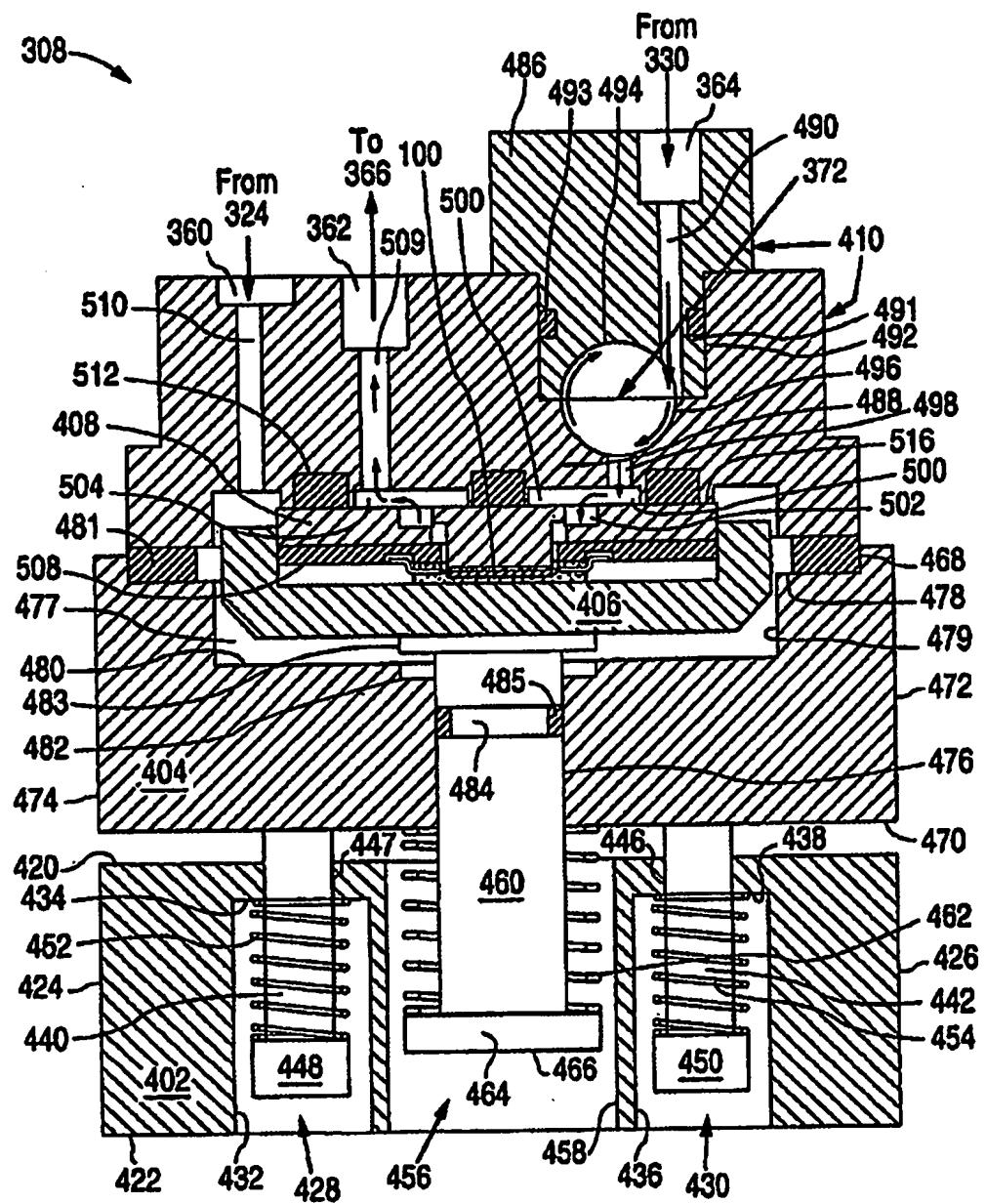
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FIG.

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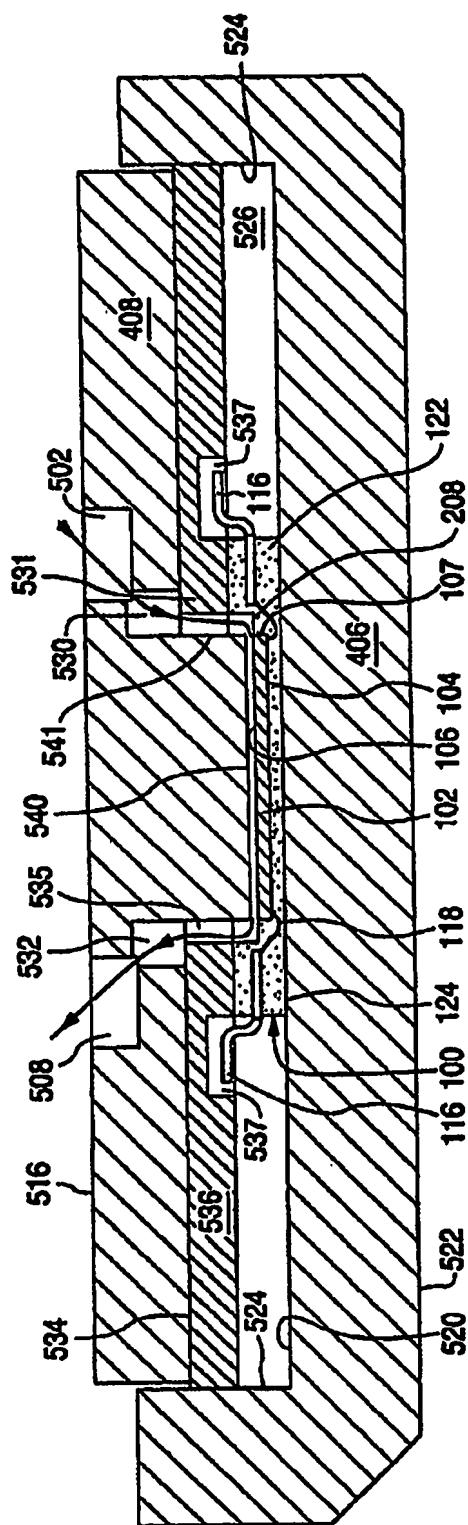


FIG. 5

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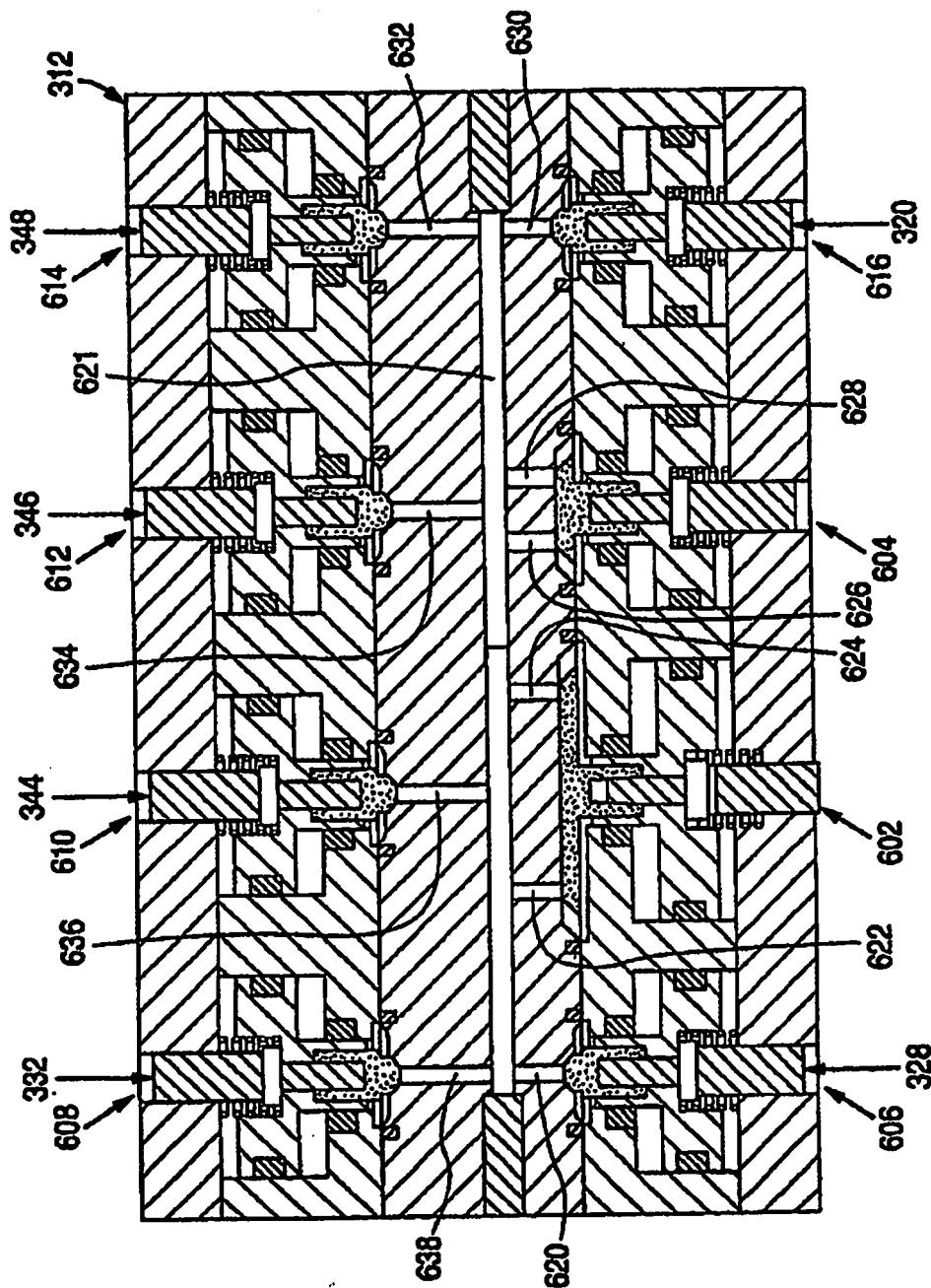


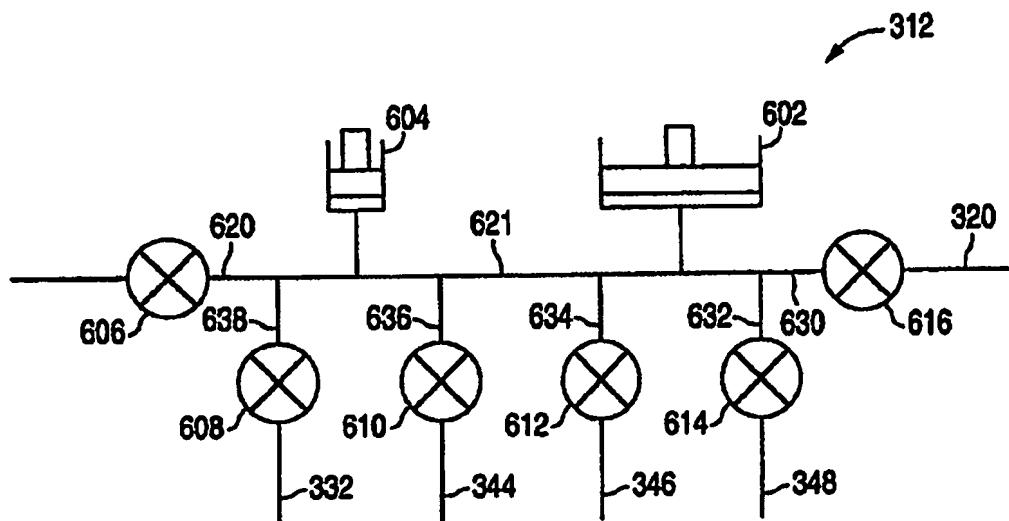
FIG. 6

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**FIG. 7**